

Figure 8.33. Beyond Linear: Working with Polynomials Lesson Plan –Day 4

Date: 10/27

Standards:

Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.

Use the structure of an expression to identify ways to rewrite it.

Highlighted Standards for Mathematical Practice:

SMP2: Reason abstractly and quantitatively

SMP 3: Construct viable arguments and critique the reasoning of others

SMP5: Use appropriate tools strategically.

SMP7: Look for and make use of structure.

SMP8: Look for and express regularity in repeated reasoning.

K: Strategies for operations with polynomials (e.g. lattice multiplication and division; long division)

U: Polynomials are very similar to integers. Arithmetic with polynomials works in the same ways as arithmetic with integers. They are closed in addition, subtraction, and multiplication, just as are integers. (Algebra is grown up arithmetic.).

D: Operate on polynomials using multiple strategies.

Explain how operating on polynomials is like operating on integers.

Pair Activity:

Create a Fact Family!

- Numeric multiplication / Division
- Algebraic multiplication / Division (show multiplication – cubic product minimum)

Whole Class:

- How do fact families help?
- Would you rather multiply or divide? Why?

Using Multiplication to Divide

- Algebra Tiles
- Lattice / Area

Partner Activity

Create a problem and trade

(Use Lattice/Area to multiply, then give division problem on opposite side)

Do It Again – Long Division

- Numeric
- Algebraic

What if the divisor is not a factor?

- Numeric
- Algebraic

Learning Profile Differentiation – Operation Comparison Project

We have been saying that working with polynomials is not that different than working with integers. It is now your job to explain what this means. Choose your method:

1. Create a Venn diagram with integers and polynomials
2. Make a tip sheet for how to perform operations on polynomials. Be sure to relate each operation to integers first and then to the polynomials.
3. An opposing page book showing the four operations – with the left page showing the operations with integers and the right page showing the operations with polynomials.

No matter which option you choose, be sure that you include:

- clear steps for the various methods and operations
- direct and specific comparisons and examples for each operation with integers and with polynomials.
- a conclusion determining if working with polynomials is more alike or more different than working with integers.

Formative Assessment/ Check for Understanding: Class observations; Operation comparison project.

Closure: Class vote: are working with polynomials more like or more different from working with integers?